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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,500	02/23/2004	Randolph B. Haagens	200311648-1	9871

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EXAMINER

SCHELL, JOSEPH O

ART UNIT	PAPER NUMBER
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2114

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/785,500	HAAGENS ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Joseph Schell	2114	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 9, 11-14, 16, 19 and 21-28 is/are rejected.
- 7) ☒ Claim(s) 5-8, 10, 15, 17, 18, 20, 29 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### ***Detailed Action***

Claims 1-30 have been examined.

Claim 23 is allowable, pending the resolution of the cited 112, 2<sup>nd</sup> paragraph rejection.

Claims 5-8, 10, 15, 17-18, 20, and 29-30 have been objected to as containing allowable subject matter, yet dependant upon rejected base claims.

Claims 1-4, 9, 11-14, 16, 19, 21-28 have been rejected.

### ***Claim Objections***

1. Claim 18 line 1 should read "the method according to claim 11 **further comprising:**"
2. Claims 22-24 use the term "computable readable program code." Computable readable sound awkward and should be changed to "computer readable" or "controller readable" or just "computable program code".

### ***Allowable Subject Matter***

3. Claims 23 and 28 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

4. Claims 5-8, 10, 15, 17-18, 20, and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: Within all cited claims save 28, the examiner deems the novel limitation to be the embedding of SCSI task attributes in write requests to be relayed that did not previously contain these task attributes. Within claim 28, the examiner deems the novel limitation to be the tracking of data for ordering by tracking a first transition from multiple outstanding write tasks to no outstanding write tasks and a second transition from one or fewer outstanding write tasks to multiple outstanding write tasks.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 2 line 5 recites the limitation "the execution order is the same in the primary target." This limitation lacks antecedent basis because, while the preamble of claim 1 recites the primary and secondary targets, the target controller is only defined as relaying commands to the secondary target. No mention is made of forwarding tasks to the primary controller.

7. Claims 3 and 27 are rejected under 35 U.S.C. 112, second paragraph, for being indefinite. The explanation of “ordinality of commands” within specification is not explicit enough to convey to one of ordinary skill in the art the bounds of the limitation “ordinality of tasks” or “ordinality of commands” within the claims. As ordinal number is a number designating a place in a sequence, the examiner is interpreting this limitation to be an ordering number.

8. Claim 11 line 4 states the limitations “the relayed commands” and “the target.” These limitations lack antecedent basis.

9. Claim 12 line 2 states the limitation “the requested commands” and line 3 states the limitation “the intended precedence.” These limitations lack antecedent basis within the claim.

10. Claim 14 line 2 states the limitation “the initiator” and line 4 states the limitation “the secondary target.” These limitations lack antecedent basis within the claim.

11. Claim 15 line 2 states the limitations “the initiator, targets and logical units” and line 5 states the limitation “the secondary target.” These limitations lack antecedent basis within the claim.

Art Unit: 2114

12. Claim 16 line 2 states the limitation "the initiator." This limitation lacks antecedent basis within the claim.

13. Claim 21 line 3 states the limitation "the relayed commands." This limitation lacks antecedent basis within the claim.

14. Claim 22 line 7 states the limitation "the requested commands," line 12 states the limitation "the relayed commands" and line 14 states the limitation "the target." These limitations lack antecedent basis within the claim.

15. Claim 23 line 5 states the limitation "the controller." While line 2 of the claim states "a controller usable medium," this limitation still lacks antecedent basis within the claim because a controller itself is not claimed.

16. Claim 24 line 5 states the limitation "the controller." While line 2 of the claim states "a controller usable medium," this limitation still lacks antecedent basis within the claim because a controller itself is not claimed.

17. Claim 25 line 4 states the limitation "the relayed commands" and line 5 states the limitation "the target." These limitation lacks antecedent basis within the claim.

18. Claim 27 line 2 states the limitation "the intended task precedence." This limitation lacks antecedent basis within the claim.

19. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, for being indefinite. The inclusion of "even briefly" in the fourth line of the claim is seemingly redundant because no time frame is mentioned for the switching of a transition point. This term should either be incorporated as a distinct limitation or removed from the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

20. Claims 1-4, 9, 11-14, 16, 19, 21-22, and 24-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamagami (US Patent 7,065,589).

21. As per claim 1, Yamagami ('589) discloses a device capable of usage in a storage system including an initiator, a primary target, and a secondary target (as shown in figure 1a, the host 100a is the initiator, the storage 110c is the primary target,

and the storage 100b is the secondary target) the device being capable of configuration for asynchronous remote mirroring functionality and comprising:

a target controller capable of communicating with the initiator and performing operations requested by the initiator (column 2 lines 31-33); and

a process on the target controller capable of receiving a stream of command requests from the initiator, performing the requested commands, and asynchronously relaying the requested commands to a secondary target while ensuring precedence graph equivalence between received and relayed commands, the process embedding task attributes in the relayed commands capable of increasing concurrency in commands performed by the secondary target (column 2 lines 33-42).

22. As per claim 2, Yamagami ('589) discloses the device according to claim 1 further comprising: a process on the target controller that receives a command stream from the initiator that specifies task attributes describing an execution sequence order, and reconveys the commands and task attributes to the secondary target so that the execution order is the same in the primary target and the secondary target (column 2 lines 33-42, the primary storage sends ordering information with the data to the secondary storage).

23. As per claim 3, Yamagami ('589) discloses the device according to claim 1 further comprising: a process on the target controller that receives a command stream from the initiator that omits specification of task attributes describing an execution sequence order, determines implied task attributes from the command stream based on



ordinality of tasks, and conveys the commands and implied task attributes to the secondary target, enabling improvement in concurrency in command execution by the secondary target (column 2 lines 33-42, the data is sent to the primary without ordering information embedded in the data, this ordering information is created by the first storage based on the order of the data received, and forwarded to the secondary storage).

24. As per claim 4, Yamagami ('589) discloses the device according to claim 3 further comprising:

- a process on the target controller that determines implied task attributes from the command stream further comprising:

- a process that infers an intended precedence graph of a primary initiator by tracking concurrency of issued tasks (column 2 lines 33-35, the order of arrival at the primary storage is noted and is inferred to be the intended ordering); and

- a process that conveys the inferred preference graph to the secondary target (column 2 lines 35-39).

25. As per claim 9, Yamagami ('589) discloses the device according to claim 1 further comprising: a process on the target controller that determines command attributes to ensure correct operation at the secondary target in the absence of the initiator supplying the attributes (column 2 lines 33-42, the primary target infers a

sequencing of data from its order of arrival and forwards it to the secondary storage to ensure correct operation at the secondary).

26. As per claim 11, Yamagami ('589) discloses a method of ordering commands in a communication system comprising:

- receiving a stream of commands (column 2 lines 29-31);
- performing the commands (column 2 lines 31-33);
- embedding task attributes in the relayed commands to increase concurrency in commands performed by the target (column 2 lines 31-42); and
- relaying the commands to a target (column 2 lines 31-42).

27. As per claim 12, Yamagami ('589) discloses a method according to claim 11 further comprising:

- inferring an intended precedence of the requested commands (column 2 lines 33-35, the correct ordering of data is inferred from the order of arrival); and
- embedding task attributes in the relayed commands according to the intended precedence to increase concurrency in commands performed by the target (column 2 lines 35-42).

28. As per claim 13, Yamagami ('589) discloses a method according to claim 11 further comprising:

receiving a command stream that omits specification of task attributes describing an execution sequence order (column 2 lines 28-35, the ordering of data is noted by the intermediary storage, not embedded within the data);

determining implied task attributes from the command stream (column 2 lines 33-35, the correct ordering of data is inferred by the order of data received); and

conveying the commands and implied task attributes to enable improvement in concurrency in commands performed by the target (column 2 lines 35-42).

29. As per claim 14, Yamagami ('589) discloses a method according to claim 11 further comprising:

receiving a command stream from the initiator that specifies task attributes describing an execution sequence order (column 3 lines 26-40, in an alternate embodiment, there are three storage systems and the data is conveyed from the first to the second to the third. Journal data (including ordering data) is created at the first storage and transferred with the data to the second storage. In this embodiment, the initiator would be the host and the first storage device that creates the journal data); and

reconveying the commands and task attributes to the secondary target so that the execution order is the same in the primary target and the secondary target (column 3 lines 26-40, the first storage sends the data with journal data to the second storage, which forwards the data and journal data to the third storage).

30. As per claim 16, Yamagami ('589) discloses the method according to claim 11 further comprising: determining command attributes to ensure correct operation in the absence of the initiator supplying the attributes (column 2 lines 33-42).

31. As per claim 19, Yamagami ('589) discloses the method according to claim 11 further comprising: relaying commands in a remote asynchronous mirroring application (column 2 lines 27-28, in a remote copy application, column 35-39, the relay is performed asynchronously).

32. As per claim 21, Yamagami ('589) discloses a method of ordering commands in a communication system comprising:

receiving a stream of command requests (column 2 lines 29-31, from primary to intermediary);

embedding task attributes in the relayed commands to improve transaction ordering for a remote mirroring application using an ordered transport (column 2 lines 33-42); and

relaying the requested commands (column 2 lines 35-39).

33. As per claim 22, Yamagami ('589) discloses an article of manufacture comprising:

a controller usable medium having a computable readable program code embodied therein for ordering commands in a communication system (column 2 lines

31-42, the recording of arrival ordering by the intermediary storage system requires a controller which executes code), the computable readable program code further comprising:

- a code capable of causing the controller to receive a stream of command requests (column 2 lines 29-31, from primary to intermediary);

- a code capable of causing the controller to perform the requested commands (column 2 lines 31-32, the intermediary stores the data);

- a code capable of causing the controller to infer an intended precedence of the requested commands (column 2 lines 33-35, the intermediary notes the arrival order of the data);

- a computable readable program code capable of causing the controller to embed task attributes in the relayed commands according to the intended precedence to increase concurrency in commands performed by the target (column 2 lines 35-42); and

- a code capable of causing the controller to relay the requested commands to a target (column 2 lines 35-42).

34. As per claim 24, Yamagami ('589) discloses an article of manufacture comprising:

- a controller usable medium having a computable readable program code embodied therein for ordering commands in a communication system (column 2 lines 31-42, the recording of arrival ordering by the intermediary storage system requires a

controller which executes code), the computable readable program code further comprising:

- a code capable of causing the controller to receive a stream of command requests (column 2 lines 29-31, from primary to intermediary);

- a code capable of causing the controller to relay the requested commands (column 2 lines 35-42); and

- a code capable of causing the controller to embed task attributes in the relayed commands to improve transaction ordering for a remote mirroring application using an ordered transport (column 2 lines 33-42, the intermediary notes the arrival order of the data and embeds it with the journal data so that the receiving storage knows the correct ordering).

35. As per claim 25, Yamagami ('589) discloses a device in a communication system comprising:

- means for receiving a stream of command requests (column 2 lines 29-31, from primary to intermediary);

- means for performing the requested commands (column 2 lines 31-32, the intermediary stores the data);

- means for embedding task attributes in the relayed commands capable of increasing concurrency in commands performed by the target (column 2 lines 33-42, the intermediary notes the arrival order of the data and embeds it with the journal data so that the receiving storage knows the correct ordering); and

means for relaying the requested commands to a target (column 2 lines 35-39).

36. As per claim 26, Yamagami ('589) discloses a remote mirroring method comprising:

communicating information between a primary initiator and a secondary target (column 2 lines 28-40, the data is eventually transferred from the initiating primary storage, through the intermediary storage, to the secondary storage);

inferring a task precedence graph intended by the primary initiator by tracking concurrency of issued tasks (column 2 lines 33-35, the intermediary storage infers a ordering of data by recording the order of data received from the primary storage); and

conveying the inferred task precedence graph to the secondary target (column 2 lines 39-42).

37. As per claim 27, Yamagami ('589) discloses the remote mirroring method according to claim 26 further comprising:

sensing the intended task precedence graph by tracking transition points dependent on ordinality of commands in a command stream (column 2 lines 33-34, the intermediary storage tracks arrival order of data. Column 6 lines 5-10, this data is stored in a FIFO and a possible transition point would be as the data enters the FIFO).

### ***Conclusion***

The prior art made of record on accompanying PTO 892 form and not relied upon is considered pertinent to applicant's disclosure. Specifically, Shomler ('871) teaches embedded sequence identification into write commands, Jones ('548) teaches a system that checks for a complete set of received packets over an iSCSI connection- including general iSCSI background information, Nakamura ('347) teaches a system where mirrored storage receives write instructions with sequence numbers and timestamps, Williams ('494) teaches a data relay that detects and marks sequential commands for a target processor, and Ozdemir ('354) teaches a redundant storage system using SCSI and iSCSI protocols.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Schell whose telephone number is (571) 272-8186. The examiner can normally be reached on Monday through Friday 9AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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